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THE PLACE OF THE NAVAL STORES INDUSTRY IN SOUTHERN AGRICULTURE

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Introduction

The naval stores industry ranks high as an element in the agricultural economy of the South. The Federal Government has recognized this industry as essentially agricultural by considering its problems under the Agricultural Adjustment Administration. Under this branch of the United States Department of Agriculture, a marketing agreement for the naval stores industry is awaiting final approval.[1] The forest conservation provisions of this marketing agreement are designed to protect the farmer and the other operators who work their woods for naval stores against overproducing and resulting low prices and at the same time conserve the public's interest in this important natural resource.

Historical

The naval stores industry is a very old one in the South, dating back to the days of the early colonial settlers in Virginia and the Carolinas. Even before the lumber business or trade in timbers developed there was a considerable volume of pitch and tar exported annually to Europe. These products were known as naval stores because their principal use was in connection with the building of wooden sailing vessels and in the shipping trade. Since colonial times, the naval stores industry has flourished in America and today the United States produces about two-thirds of the world's supply.

All of the turpentine and rosin produced in the United States comes from the Southeast. Some production comes from each state bordering on the Atlantic Coast or the Gulf of Mexico, from North Carolina to Texas, but for many years Georgia and Florida together have produced the bulk (between 70 and 80 percent) of the total domestic output. Naval stores are obtained from slash and longleaf pines. The original stands of these species have been so depleted that practically the entire present production comes from second-growth trees. Timberland owners in Mississippi, Alabama, Louisiana, and Texas operated in their virgin stands at a later date than in the eastern states and most of the second-growth stands in this western part of the South are not yet of working size. As they come into production the yield of naval stores from these states will no doubt increase.

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[1] Approved by the Secretary of Agriculture, April 2, 1934.

Naval Stores Production

Based on the best information available the production of turpentine in 1933 is estimated at 450,000 barrels, which represents a substantial increase over the 390,000 barrels produced in 1932 but is a 10 percent decrease over the 1931 production. Since 1900 the annual production of turpentine, according to U. S. Census figures, has usually ranged between 500,000 and 650,000 barrels, with an average of 529,000 barrels during the 14-year period from 1920 to 1933, inclusive. The peak was reached in 1908, when 750,000 barrels were produced, and the low point, except for the war year 1918, was 1932.[2] Although these figures cover turpentine only, the quantities of rosin produced can readily be estimated by multiplying by 3-1/3, since for each barrel of turpentine distilled approximately 3-1/3 barrels of rosin are produced.

Value of Naval Stores

Since 1921, the net cash returns to producers at the stills ranged from a high peak of 54 million dollars in 1926 to a low figure of about 12 million dollars in 1932. During the 14-year period from 1920 to 1933, inclusive, these returns from naval stores have averaged about 36 million dollars annually. In 1929, when the value of naval stores was 39 million dollars, the gum turpentine industry employed 41,740 persons, who were paid nearly 17 million dollars in wages. The value of forest products other than naval stores and including firewood, pulpwood, posts, ties, poles, and piling, sold from farms in 12 southern states amounted to 82 million dollars in 1929.

Extent of Present Naval Stores Operation

The major commercial naval stores belt covers an area of about 50 million acres, extending along the Coastal Plain from South Carolina to Mississippi. Exclusive of lands cleared for agriculture, and cypress and hardwood tracts, the estimated net area of second-growth slash and longleaf timber in this belt is approximately 30 million acres.

The average number of cups per acre on the area where faces are being actively worked is estimated to be around 8 or 10. Studies made of Hamilton County, Florida, showed an average of 8.9 cups per acre, and of Bradford County, Florida, 9.3. An average annual yield of 500,000 barrels of turpentine represents production from about 125,000,000 cups, which would require the working of only 4 cups per acre distributed over the entire 30 million acres in the turpentine belt. On the basis of 9 cups per acre for the area actually worked, this indicates that somewhat

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[2] The control Committee for Gum Turpentine and Gum Rosin Processors originally fixed the total volume to be marketed in 1934, at 388,000 barrels, which was subsequently changed to 405,000 barrels.

less than one-half of forest land is being worked for turpentine at any one time, the balance being either worked out, resting, or immature.

A well-stocked, evenly distributed stand of turpentine trees contains 100 to 200 trees per acre. Each tree can be turpentined for at least 10, and many of them for 15 or more years. Assuming that the trees are worked for 10 years and that they are 40 years of age when working is completed, one-fourth of the trees can be worked during each 10-year period, if the operation is to be continuous on each acre. This would mean that 25 to 50 trees could be worked per acre continuously, or many times the number required to maintain present production. Even if the entire naval stores belt were stocked with an average of 50 turpentine trees per acre, the number of available crops of cups would be sufficient to more than triple present production. It is not unreasonable to assume that under intensive management and fire protection an even greater yield could be maintained. Here lies a direct challenge to the chemist. Increased uses for naval stores products must be found if the potentialities of this great resource are to be fully realized.

Value of Naval Stores to the Individual Farmer

Cuppage lease prices vary with the market for naval stores and during the last few years have ranged between 1-1/2 and 5 cents per cup per year, with an average of around 3 cents per cup. A farmer may lease his forest for turpentining or he may work the timber himself. On a conservative estimate of an average of 10 working cups per acre, the revenue from naval stores leases amounts to 30 cents per acre annually, with little expense to the owner. This return is generally ample to take care of the average taxes in this region and to provide a fair income from forest land in addition.

It is often more advantageous for farmers personally to work their own trees, disposing of the gum to a still owner, than to lease out the cupping rights. Not only may this prove of advantage financially, but the farmer with a direct interest in his own timber can avoid the damaging effects of working it following extraordinary conditions, such as those caused by severe fire or drought. He might also be inclined to practice more conservative turpentining methods than those used by operators on leased lands. Operators leasing timber do not have the same incentive to safeguard the trees, and heavy losses often follow their failure to rest the timber when that would safeguard the future health of the trees.

Another advantage to the farmer who works the trees himself is that he gets cash returns for his labor. If he hauls the gum to a still he also gets paid for the use of this team or truck. Normally he can fit his naval stores operations into a program of diversified agriculture.

Naval Stores Research

The results of naval stores research carried on by the Southern Forest Experiment Station are available to the naval stores industry. Many of the practices recommended as a result of the Station's investigations have already been adopted. Some of the simple conservation measures which farmers might follow to advantage in their naval stores woods practice are as follows:

1. By using narrow streaks (1/4 to 3/8-inch wide) it is practical to hold turpentine faces to an average height of 8 or 10 feet in 8 or 9 years' time. The height of face cut in any one season should be limited to 16 inches for longleaf pine and 12 inches for slash pine. This will make it possible to practically double the customary working life of a tree. A longer work period for each face allows more time for the tree to grow before back-facing, with a resulting increase in its gum yielding capacity.

2. In average second-growth stands the most satisfactory depth of streak has proven to be 1/2-inch for slash pine and 3/4-inch for longleaf.

3. Face widths should not exceed one-third of the bark circumference, if trees are to be worked with 2 or 3 separate faces and without long rest periods following the working out of each face. The faster growing trees may be worked on a 3-cup rotation, each face for 6 to 8 years with a 2-year rest period following the working-out of each face. Not more than one face should be worked per tree at any one time in second-growth timber except when trees are to be removed for stand improvement.

4. Average gum yields increase with increased size of tree. Gum yields depend to a large extent on growth rate which is reflected in size of crown. Confining chipping to trees 9 inches in diameter or larger permits the smaller ones to grow to profitable working size. The larger trees are better able to withstand shipping than the smaller ones. This has been officially recognized in the recently approved naval stores marketing agreement, which provides that no naval stores may be marketed from trees less than 9 inches in diameter worked with one face, nor from trees less than 14 inches in diameter worked with 2 faces unless they were being worked under a contract signed before September 14, 1933.

5. Gum yields maintained at a high level over a period of 5 years have been obtained when tins have been raised by tacking in shallow streaks on the face, as compared with

inserting them in deep axe or chisel cuts. Under the latter method, yields decrease at the rate of about 5 percent for each year of working. Avoiding deep cuts also minimizes the loss from insects and wind break. Tacking tins on with heavy hide tacks, which can later be removed, is preferable to using even shallow cuts in the face for inserting tins.

6. Air temperature has a decided influence on gum yields, the yields increasing with higher temperatures. Because winter temperatures adversely affect gum yields, chipping during that period (November to February, inclusive) should not be oftener than once-a-month, if practiced at all. Turpentining at more frequent intervals than once a week may prove advisable during periods of high average temperature (June to August).

7. Chipping tools should be kept sharp so as to insure clean cuts. A chip paddle to cover tins and cups should be used during chipping operations.

8. Trees in dense stands are slowed up in growth, which results in lowering the average gum yield per tree. Such stands need thinning, removing the slow-growing and worked-out trees to improve the health and gum-yielding capacity of the remainder.

9. Growth rate is reduced somewhat by turpentining. The volume growth of trees with one face is reduced about one-fourth. Two faces worked simultaneously reduce growth very much more. This loss in wood growth is, however, more than offset by the revenue from the naval stores operation.

Another source of loss in growth which accompanies naval stores operations is due to fire. Old turpentine faces offer a special fire hazard; when burned they are almost invariably attacked by boring insects. This renders the butt log unmerchantable and it is customarily cut off and left in the woods. This loss may be greatly reduced by fire protection and the use of the chipping practices just outlined. The Forest Survey now under way by the Southern Forest Experiment Station in the naval stores belt will provide an accurate picture of the quantity and distribution of naval stores timber now being worked and available in the near future. The object of this survey is threefold:

1. To furnish an inventory of the present supply of forest products, including saw timber, naval stores, poles and piling, pulpwood, etc.
2. To determine the rate at which the supply of these products is increasing by natural growth.
3. To ascertain the rate at which these present supplies are being depleted through man's utilization and by such natural losses as fire, disease, etc.

This survey will serve as a basis for determining the possibilities of sustained production and conservation of our timber natural resources. At the present rate, the forest survey field work in the primary naval stores belt should be completed during the next year. A canvass of all operators and gum producers is also being made as part of the Survey to obtain economic data on woods and still practices.

Other Forest Products

The turpentine farmer has many opportunities for marketing a variety of forest products other than naval stores. These include sawlogs, ties, poles, piling and pulpwood. These can be obtained both from trees that have been worked out for turpentine as well as from trees that are removed in thining operations for the betterment of the stand. The outlook for utilizing small trees removed in thinnings and from the tops of worked-out trees is particularly promising because of the prospects for a future trend southward in the paper industry. In 1929 the value of the pulp and paper produced in the South amounted to over 52 million dollars and ranked second to lumber and cooperage among the forest products, exceeding even the value of turpentine and rosin. The pulp and paper industry in the South employed 4,722 persons in that year. Most of the pulpwood came from farm woodlands.

The wood used in the manufacture of pulp comes mostly from small bolts, often not over 4 inches in diameter. The industry prefers to use sapwood, which is low in resin content. It is apparent then that trees which have been used for naval stores purposes are less desirable than unturpentined trees for pulpwood; at least it is necessary to cull the pitchy portion of the tree. On the other hand a market for small pulpwood bolts would make it possible to thin out over-crowded stands of saplings at a profit, thereby improving the remaining stand and bringing in an intermediate revenue. The ideal management of a timber tract in the naval stores belt might well consist of utilizing the first thinnings for pulpwood, making a second thinning by turpentining, turpentining the majority of the crop trees and favoring the best trees for lumber, poles, and piling. Studies to determine the most profitable utilization of all trees in stands worked principally for naval stores are now being made by the Southern Forest Experiment Station.

All in all the owner of southern woodland property is in a very favorable position regarding markets for the products of his forest. The turpentine farmer can profit by adopting conservative methods of working his trees for naval stores and by following the forestry measures recommended as a result of forest research. There is no doubt but that the naval stores industry will continue to take a high place among southern agricultural crops, if markets can be maintained or expanded. In this much dependence must be placed in the ability of the chemist to improve and expand the uses of naval stores products.